In the Claims

1. (Currently Amended) A system comprising:

an interface coupled to a bus to receive a real time video stream to be encoded using a parallel macroblock loop comprising a first and second group of video encoding tasks, wherein the first group of video encoding tasks comprises video encoding tasks not including variable length encoding tasks and the second group of video encoding tasks comprises variable length encoding tasks;

a main processor coupled to the bus, the main processor to ~~process~~ execute the first group of video encoding tasks on a macroblock;

a co-processor coupled to the bus, the co-processor to ~~process~~ execute the second group of video encoding tasks on a macroblock previously processed by the main processor, wherein ~~the processing of~~ the first group of video encoding tasks is executed substantially concurrently with the ~~processing~~ execution of the second group of video encoding tasks.

2. (Original) The system of claim 1 wherein the first group of video encoding tasks and the second group of video encoding tasks comprise those tasks required of at least one of the Moving Pictures Expert Group (MPEG) standards for video encoding.

3. (Original) The system of claim 1 wherein:

the first group of video encoding tasks comprises at least motion estimation, pre-processing, mode selection, forward discrete cosine transform computation, forward quantization computation, rate control, zig zag scanning, inverse discrete cosine transform computation, inverse quantization computation, and motion compensation; and

the second group of video encoding tasks comprises variable length encoding computation.

4. (Original) The system of claim 3 wherein the variable length encoding computation comprises:

      macroblock header encoding;

      motion vector encoding; and

      discrete cosine transform coefficients encoding.

5. (Original) The system of claim 3 wherein the motion estimation comprises:

      a first phase includes top to top searching and bottom to bottom searching; and

      a second phase includes top to bottom searching and bottom to top searching.

6. (Original) The system of claim 3 wherein the pre-processor is a variable length encoder/decoder co-processor.

7. (Original) The system of claim 1 wherein the co-processor is a variable length encoder/decoder co-processor.

8. (Original) The system of claim 1 wherein the interface is at least one of a broadcast interface and a network interface.

9. (Original) The system of claim 1 further comprising:

      an audio output interface; and

      a video output interface.

10. (Currently Amended) The system of claim 1 wherein the real time video stream is at least one of a television signal received wirelessly and a television stream received via a hardwired connection.

11. (Canceled)

12. (Currently Amended) A system comprising:

      a main processor coupled to a bus;

a co-processor coupled to the bus;

a main memory coupled to the bus;

an interface coupled to the bus to receive a real time video stream to be encoded using a parallel macroblock loop comprising a first and second group of video encoding tasks, wherein the first group of video encoding tasks comprises video encoding tasks not including variable length encoding tasks and the second group of video encoding tasks comprises variable length encoding tasks; and

a video encoding process executed from the main memory by the main processor to cause the main processor to allocate the first group of video encoding tasks to the main processor and allocate to the co-processor the second group of video encoding tasks, wherein the main processor ~~processes~~ executes the first group of video encoding tasks on a macroblock substantially concurrently with the co-processor ~~processing~~ executing the second group of video tasks on a macroblock previously processed by the main processor.

13. (Original) The system of claim 12 wherein the well known standard is at least one of the Moving Pictures Expert Group (MPEG) standards for video encoding.

14. (Previously Presented) The system of claim 12 wherein the encoding tasks comprises at least motion estimation, pre-processing, mode selection, forward discrete cosine transform computation, forward quantization computation, rate control, zig zag scanning, inverse discrete cosine transform computation, inverse quantization, and motion compensation; and

the second group of video encoding tasks comprises variable length encoding computation.

15. (Original) The system of claim 14 wherein the variable length encoding computation comprises:

macroblock header encoding;

motion vector encoding; and

discrete cosine transform coefficients encoding.

16. (Original) The system of claim 14 wherein the motion estimation comprises:

a first phase includes top to top searching and bottom to bottom searching; and

a second phase includes top to bottom searching and bottom to top searching.

17. (Original) The system of claim 14 wherein the pre-processing comprises:

noise reduction.

18. (Previously Presented) The system of claim 12 wherein the co-processor is a variable length encoder/decoder co-processor.

19. (Previously Presented) The system of claim 12 wherein the interface is at least one of a broadcast interface and a network interface.

20. (Previously Presented) The system of claim 12 further comprising:

an audio output interface; and

a video output interface.

21. (Previously Presented) The system of claim 12 wherein the real time video stream is at least one of a television signal received wirelessly and a television stream received via a hardwired connection.

22. (Canceled)

23. (Previously Presented) The method of claim 28 wherein the video encoding is performed according to at least one of the Moving Pictures Expert Group (MPEG) standards for video encoding.

24. (Currently Amended) The method of claim 28 wherein:

the first group of video encoding tasks comprises at least motion estimation, pre-processing, mode selection, forward discrete cosine transform computation, forward

quantization computation, rate control, zig ~~zaq~~ zag scanning, inverse discrete cosine

transform computation, inverse quantization computation, and motion compensation; and

the second group of video encoding tasks comprises variable length encoding

computation.

25. (Original) The method of claim 24 wherein the variable length encoding computation

comprises:

macroblock header encoding;

motion vector encoding; and

discrete cosine transform coefficients encoding.

26. (Original) The method of claim 24 wherein the motion estimation comprises:

a first phase that includes top to top searching and bottom to bottom searching;

and

a second phase that includes top to bottom searching and bottom to top searching.

27. (Original) The method of claim 24 wherein the pre-processing comprises:

noise reduction.

28. (Currently Amended) A method for video encoding comprising:

receiving a real time video stream to be encoded using a parallel macroblock loop

comprising a first and second group of video encoding tasks, wherein the first group of

video encoding tasks comprises video encoding tasks not including variable length

encoding tasks and the second group of video encoding tasks comprises variable length

encoding tasks;

performing picture level and upper processing on a main processor;

executing a macroblock loop in parallel on the main processor and a co-processor,

wherein ~~executing includes processing on~~ the main processor executes the first group of

video encoding tasks on a macroblock substantially concurrently with ~~the processing on~~

the co-processor executing the second group of video encoding tasks on a macroblock

previously processed by the main processor; and

outputting an encoded version of the real time video stream.

29. (Previously Presented) The method of claim 28 wherein the co-processor is a variable length encoded/decoder co-processor.

30. (Previously Presented) The method of claim 28 wherein the real time video stream is at least one of a television signal received wirelessly and a television stream received via a hardwired connection.

31. (Canceled)

32. (Previously Presented) The method readable medium of claim 37 wherein the first group of video encoding tasks and the second group of video encoding tasks comprise those tasks required of at least one of the Moving Pictures Expert Group (MPEG) standards for video encoding.

33. (Previously Presented) The machine readable medium of claim 37 wherein:
    the first group of video encoding tasks comprises at least motion estimation, pre-processing, mode selection, forward discrete cosine transform computation, forward quantization computation, rate control, zig zag scanning, inverse discrete cosine transform computation, inverse quantization computation, and motion compensation; and
    the second group of video encoding tasks comprises variable length encoding computation.

34. (Original) The machine readable medium of claim 33 wherein the variable length encoding computation comprises:
    macroblock header encoding;
    motion vector encoding; and
    discrete cosine transform coefficient encoding.

35. (Original) The machine readable medium of claim 33 wherein the motion estimation comprises:

a first phase that includes top to top searching and bottom to bottom searching; and

a second phase that includes top to bottom searching and bottom to top searching.

36. (Original) The machine readable medium of claim 33 wherein the pre-processing comprises:

noise reduction.

37. (Currently Amended) A machine readable medium having instructions stored thereon which when executed by a main processor cause the main processor perform operations to encode a real time video stream according to a well known standard, the operations comprising:

allocating a first group of video encoding tasks comprising those video tasks not included in the variable length encoding to the main processor;

allocating a second group of video encoding tasks comprising variable length encoding tasks involved with encoding the real time video stream to the co-processor; and

encoding the real time video stream using a macroblock loop executed in parallel, wherein ~~by processing~~ the first group of video encoding tasks is executed on a macroblock by the main processor substantially concurrently with ~~the processing of~~ the second group of video encoding tasks being executed on a macroblock previously processed by the main processor by the co-processor.

38. (Previously Presented) The machine readable medium of claim 37 wherein the co-processor is a variable length encoded/decoder co-processor.

39. (Previously Presented) The machine readable medium of claim 37 wherein the real time video stream is at least one of a television signal received wirelessly and a television stream received via a hardwired connection.